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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/326,056

06/04/99

MCCLELLAN

K

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EXAMINER

LEE, S

ART UNIT

PAPER NUMBER

2878

3

DATE MAILED:

03/14/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/326,056

Applicant(s)

MCCLELLAN, KENNETH J.

Examiner

Shun Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 1999.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 5-10 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 5-10 do not further limit the crystal scintillator as recited in claims 1 or 2. Examiner suggest amending claims 5 and 8 into independent form.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Kurata *et al.* (US 5,690,731).

Kurata *et al.* disclose a crystal scintillator having the general formula R_2SiO_5 where R is at least one rare-earth element selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Tb, Dy, Ho, Er, Tm, Yb, Lu, Y, and Sc (column 1, lines 6-9; column 4, lines 4-16). It is known in the art that for small rare-earth ions (e.g., Lu, Y), the rare-earth oxyorthosilicates (e.g., Lu_2SiO_5 , Y_2SiO_5) have a monoclinic C lattice structure. Rare-earth oxyorthosilicate crystal scintillators activated with Ce are also known in the art. Thus inherent in Kurata *et al.*'s disclosure is a transparent single crystal scintillator

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of cerium activated lutetium yttrium oxyorthosilicate having the formula

$\text{Lu}_{(2-x-z)}\text{Y}_x\text{Ce}_z\text{SiO}_5$ (i.e., R is the group consisting of Lu, Y, and Ce and thus

$\text{R}_2 = \text{Lu}_{2-(x+z)}\text{Y}_x\text{Ce}_z$, with $0.001 \leq z \leq 0.02$ and either $0.05 \leq x \leq 1.95$ or $0.2 \leq x \leq 1.8$).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurata *et al.* (US 5,690,731) in view of Loutts *et al.* (J. of Crystal Growth 174:331-336, 1997) and Melcher *et al.* (J. of Crystal Growth 128:1001-1005, 1993).

Kurata *et al.* lacks a description of the emission properties of the scintillator crystal. Loutts *et al.* teach that most physical properties (e.g., luminescence emission) of combinations of Ce activated rare-earth oxyorthosilicates vary almost linearly with combination (see conclusions on pg. 336). Melcher *et al.* teach that for small rare-earth ions (e.g., Lu, Y), the rare-earth oxyorthosilicate lattice has a monoclinic C structure (see first paragraph of introduction on pg. 1001). Melcher *et al.* also teach that luminescence emission in Ce activated material arises from the 5d-4f transitions in Ce^{3+} where the 5d level is modified by the crystal field of the rare-earth oxyorthosilicate lattice (see third paragraph of results on pg. 1003 to 1004). Melcher *et al.* further teach that the Ce activated rare-earth oxyorthosilicate (where the rare earth is either Lu or Y) has a luminescence wavelength of about 420 nm (see Fig. 3) and a luminescence decay

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time of about 35-45 ns (see Fig. 4). Therefore it would have been obvious to one having ordinary skill in the art that the scintillator crystal of Kurata *et al.* has a luminescence wavelength of about 420 nm and a luminescence decay time of about 35-45 ns since the luminescence arises from the 5d-4f transitions in Ce^{3+} and combinations of small rare-earth ions (*i.e.*, Lu and Y) in a rare-earth oxyorthosilicate lattice will have a monoclinic C structure as taught by Loutts *et al.* and Melcher *et al.*

6. Claims 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurata *et al.* (US 5,690,731) in view of Fitzpatrick (US 5,500,147).

Kurata *et al.* teach that a single crystal of cerium activated lutetium yttrium oxyorthosilicate is used in a scintillation detector as a scintillator (column 1, lines 6-9). Kurata *et al.* lacks a detail description of a photodetector in the scintillation detector. Photodetectors used in scintillation detectors are well known in the art. For example, Fitzpatrick teaches that a photodetector (*e.g.*, photomultiplier tube or charge-coupled device) is optically coupled to a crystal scintillator for detecting light from the crystal scintillator (column 2, lines 63-65). Therefore it would have been obvious to one having ordinary skill in the art that the scintillation detector of Kurata *et al.* has a photodetector (*e.g.*, photomultiplier tube or charge-coupled device) which is optically coupled to a crystal scintillator for detecting light from the crystal scintillator

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patent 4,185,201 (Stevens) disclose a Ce activated rare-earth

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(i.e., combinations of Y, La, Lu; column 4, lines 10-15) oxyorthosilicate phosphor (column 1, lines 60-66).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seungsook Ham can be reached on (703) 308-4090. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SL
March 7, 2001


SEUNGSOOK HAM
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